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AGRICULTURAL MEMORANDUM NO 431

VITICULTURE IN ENGLAND AND WALES

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Interest in commercial viticulture in this country has grown rapidly over the past year and a number of enquiries have been received on the subject of areas climatologically suitable for viticulture.

This memorandum is a preliminary attempt to define such areas in terms of growing season temperatures and a brief discussion of some of the meteorological factors which might prove limiting to viticulture on a commercial scale.

The active growing season for vines in this country is May to October with harvesting spread over into November in some years. Flowering is during late June and July, usually after the last spring frost. Climatic data for northern European and New Zealand wine regions (Berrysmith; Nakagawa) suggest:-

1. There is practically no growth at air temperatures below 10°C.

2. A "heat unit" summation (monthly mean temperature -10°C multiplied by number of days) of at least 1,000 degree days C over the growing season is required for ripening.

3. Grapes in Europe can survive mean monthly temperatures as low as -5°C and minima below -20°C so that winter temperatures in England and Wales are not limiting.

4. Spring frosts with minima below about -2½°C could damage young shoots.

5. Growing season rainfall should be at least 12 inches following a winter rainfall of at least 15 inches.

Other relevant factors include:-

1. Wet weather during flowering period adversely affects pollenation.

2. Autumn frosts cause leaf drop and so cut down rate of sugar accumulation.

3. High sunshine totals during August to October are required for ripening and high sugar content.

4. About 100 to 110 days are required from flowering to harvest.

5. Hail in summer and autumn is a potential hazard.

6. Too early ripening is undesirable since ripeness may coincide with maximum wasp activity.

7. Wind can be a limiting factor in growth and may also affect the maximum height to which vines may grow and so govern the planting density.

Examination of a large number of May to October heat unit totals for England and

Wales for the decade 1961-70 shows no station with average values up to the required 1,000 degree days although a few stations do approach this level in one or two years. Nevertheless vines are being grown successfully and the distribution of some of the existing vineyards is shown in figure 1.

Normal meteorological data are recorded on level, open, grassed sites and the success of viticulture would appear to be due to the advantages of planting on a slope, well above the valley floor and having a southerly aspect and bare soil between the vines. Such an exposure will gain over the standard site in several ways:-

1. The southerly aspect gains maximum benefit from solar heating.

2. The sloping site gains more heat because of the angle of incidence of the sun's rays.

3. A sloping site with a north to south alignment of vines allows free drainage of cold air and decreases risk of frost.

4. Bare soil should produce higher minima by night and higher maxima by day.

To produce an extra 100 degree days over the growing season, these factors, combined with any natural or artificial shelter, are required to produce an increase in mean daily temperature of $\frac{1}{2}^{o}$C over the whole period. The distribution of existing vineyards suggests that an average heat unit total of about 750 degree days at a standard station is a reasonable limit and that we must look to site selection to give an advantage of 1 to $1\frac{1}{2}^{o}$C in mean daily temperature over the standard meteorological site.

The area bounded (approximately) by the 750 degree day line is shown in figure 1. Within this area it should be possible to find sites suitable for commercial viticulture but it is in no way suggested that the area includes all suitable or excludes all unsuitable sites.

The variation about the average value is considerable and in 1962, for example, most places had some 150 degree days less than the decade average while some were over 200 degree days lower.

It is interesting to note that a comparison between the 1961-70 average temperatures and the 1931-60 averages for 25 stations in southern England and Wales shows a general cooling in May to September but a warming in October. The mean differences (1961-70 minus the standard period average) are:-

	May	June	July	August	September	October
Mean difference ^{o}C	-0.2	-0.1	-0.6	-0.7	-0.1	+0.7
Standard deviation	0.21	0.18	0.20	0.14	0.20	0.22

Any future planning based on the map at figure 1 must take into account the possibility of this trend continuing and also of the anomalous October warming regressing to the trend of the remaining months. This would result in a considerable decrease in potentially suitable areas for viticulture.

Any criticism or suggestions on this paper should be addressed to the author.

REFERENCES

Berrysmith, F. Grape growing prospects throughout New Zealand. N.Z.J.Agr., July 1968.

Nakagawa, Y. Studies on the favourable climatic environment for fruit culture, part V. Analysis of climatological conditions in the major productive areas of grapes and apples in the world (Japanese with English summaries and English table headings) Bull. Hort. Res. Stat.,Hiratsuka, 1968, No 7, pp 111-114.

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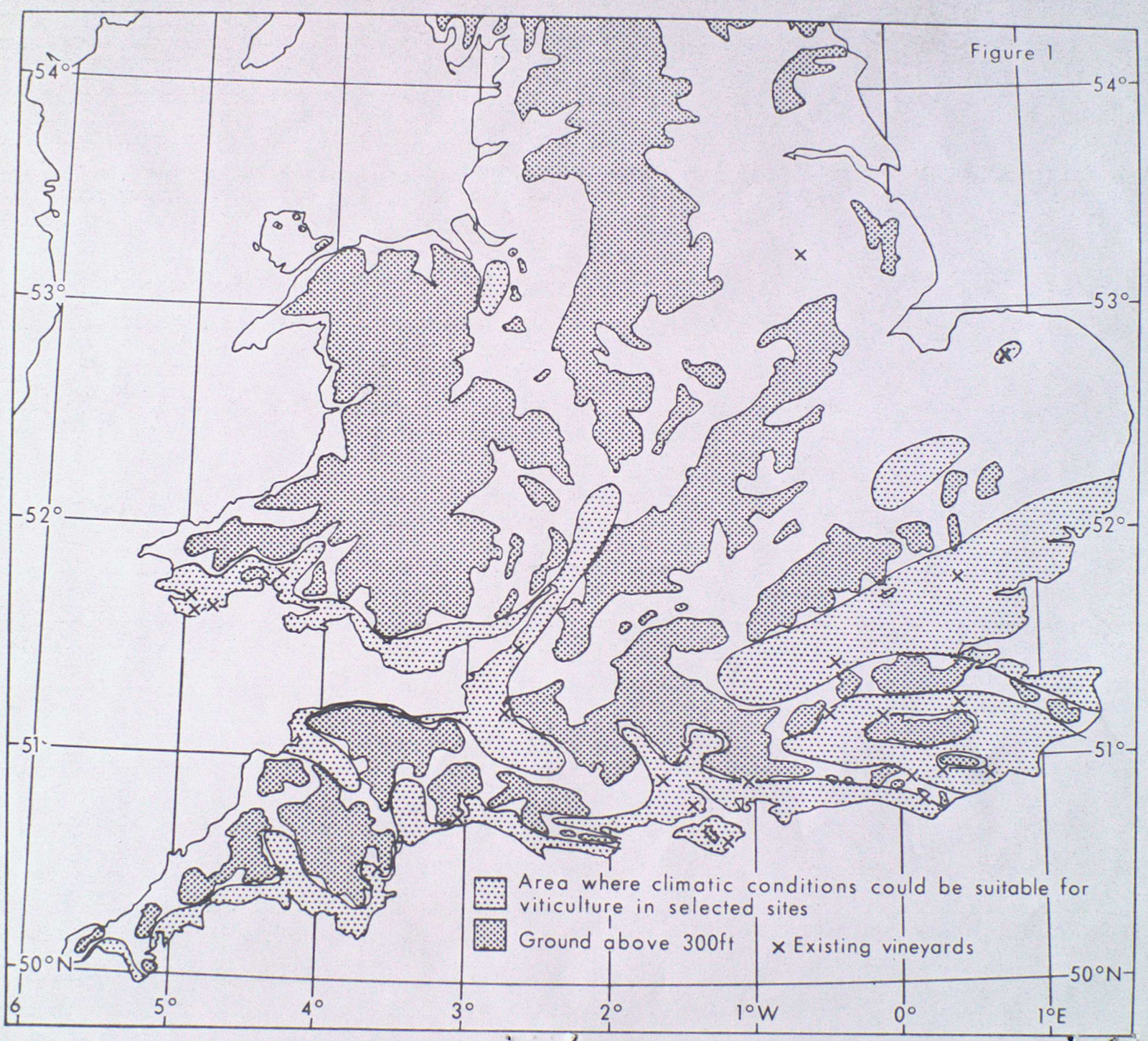
Figure 1
54°
53°
52°
51°
50°N
6
5°
4°
3°
2°
1°W
0°
1°E
Area where climatic conditions could be suitable for viticulture in selected sites
Ground above 300ft
× Existing vineyards